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Odor Report (1949)

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FINAL REPORT

on the

ANDROSCOGGIN RIVER STUDIES

1949

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Lewiston, Maine
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SUMMARY

1. During the summer of 1949, the Androscoggin river odor in the Lewiston - Auburn areas was at the lowest average level of any of the seven years in which odor observations have been made.

2. With perhaps one possible exception, hydrogen sulfide was not detected in the air above the water at North and South bridges nor at the Lewiston Gate House. Pigpen odor was much less in evidence.

3. Odor from the Pond, of sufficient intensity to reach station number six, was recorded only on five occasions.

4. Weather conditions were very adverse. Higher than average air and water temperatures prevailed from June to September, and low river flows from June through September.

5. Owing to the improvement in the river water reaching Lewiston, it was not necessary to pass the water through the wheels at the local mills during the week-end shut down to avoid release of odor at the Lewiston Falls.

6. As reported elsewhere, the use of sodium nitrate and the somewhat lower production of sulfite pulp were beneficial.

FINAL REPORT ON THE ANDROSCOGGIN RIVER ODOR IN THE LEWISTON - AUBURN AREA 1949

Introduction. Daily observations of Androscoggin River odor were begun on June 17 and continued through September 30, 1949. The reports recording these observations are numbered from one to one hundred and six, inclusive.

To facilitate comparison with previous years the form of this report, station locations, odor terms and intensities, etc., are the same as those employed since 1943.

The very low odor intensities observed in downtown Lewiston and Auburn were due to a somewhat lower volume of sulfite production and to the application of sodium nitrate to the water. Weather conditions during much of the summer were very adverse, producing high water temperatures and low water flows.

Daily Report Data. The daily reports contain data on

a. Air temperature at Station #6
b. Rainfall
c. Direction of the wind
d. Water passing over the Lewiston Falls
e. Depth color of the river water
f. River water surface conditions
g. Types of river water odor
h. Intensities of the river odor in the air
i. Notes on other pertinent subjects

Odor Observation Stations. No changes were made in the location of odor observation stations.

Table #1

Locations of Observations Stations

1.	Spruce and Park Streets, Lewiston	Barron's Map	C.3.
2.	South Bridge, Lewiston - Auburn	"	D.3.
3.	North Bridge, Lewiston - Auburn	"	C.3.
4.	Main and Canal Streets, Lewiston	"	C.3.
5.	Holland and Spring Streets , Lewiston	"	B.4.
6.	Campus and Bardwell Streets, Lewiston	"	C.4.
7.	Rook and Sixth Avenue, Auburn	"	D.2.
8.	Oak and Hampshire Streets, Auburn	"	B.2.

Stations numbered seven and eight were not visited as frequently as in previous years. The river odor intensity was too low in intensity to reach these localities in detectable amounts.

Air temperatures. The temperature of the air recorded in the daily reports was that existing at 111 Bardwell Street, Lewiston, usually at the time the observations were begun.

The official summer mean hourly air temperatures for 1941 through 1949 are recorded in Table #2. Temperatures during June, July and August this year were high and much above the sixty-five year average. June was surprisingly warm, 6.6 degrees hotter than June, 1948, and 3.5 degrees above the sixty-five year average. September temperatures were much lower than those of the past five years but were only about one half of a degree below the long term averages.

Table #2

Mean Hourly Temperatures

Year	June	July	August	September
1949	66.6	71.6	69.9	58.7
1948	60.0	70.5	69.9	61.2
1947	60.9	71.1	70.4	60.8
1946	63.6	67.9	64.7	61.4
1945	62.1	68.2	67.7	61.5
1944	63.5	69.8	72.6	60.7
1943	65.0	70.3	66.1	57.7
1942	64.7	68.8	68.2	60.7
1941	65.8	69.9	65.8	60.7

Humidity. No measurements of the humidity were made during 1949.

Rainfall. Precipitation during the past summer was again sub-normal; the dry cycle has thus completed its third successive year. The combined June, July and August totals are 4.54 inches below the seventy-five year average. The September rains, which were about one-half inch above the average, came too late to influence the odor situation.

Table #3

Rainfall (Inches)
Lewiston, Main Street Gate House

Year	June	July	August	September
1949	1.52	1.13	1.96	4.07
1948	3.89	1.50	2.04	0.91
1947	4.07	5.89	0.70	2.75
1946	1.89	4.59	7.30	4.65
1945	5.39	3.18	2.46	2.49
1944	5.25	3.99	1.43	6.29
1943	3.11	4.04	4.63	1.63
1942	6.54	2.92	1.09	2.82
1941	0.78	3.97	1.72	0.95

Wind Direction. There is nothing unusual to report as to prevailing winds recorded this summer.

Water Flowing over the Lewiston Falls. River Flows. Owing to the low volume of river flow spilling over the Lewiston Falls was seldom permitted. Sometime Sunday, late afternoon or evening, the canal by-pass gates would be open to provide water to the mills downstream.

The much lower odor levels which prevailed this year made unnecessary the passing of the week-end surplus water through the wheels in the local mills.

Color of the River Water. The "depth" color of the river water became black on about August 2 and remained so for the remainder of the odor season. The cause of this change is described elsewhere in this 1949 report.

River Surface Conditions. In the area between the Lewiston Falls and South Bridge, the surface of the river has been cleaner than in previous years. The foam was a lighter color and was less persistent; brown scum was seldom present in large quantities. Surface films appear to be decreasing in area covered and in frequency of appearance.

Floating sludge was not observed south of Gulf Island Dam; it has been absent from this area since the summer of 1944. The amount of floating sludge observed by the writer just north of the Dam was negligable

Table #4

Volume of Water Flowing over the Lewiston Falls
Days per Month.

1949	Zero	Very Small	Small	Moderate	Large
June	9	0	3	2	0
July	24	0	4	3	0
August	30	0	1	0	0
September	27	0	3	0	0
1948					
June	12	0	1	0	0
July	22	0	7	2	0
August	29	0	2	0	0
September	30	0	0	0	0
1947					
June	1	1	10	7	0
July	10	3	9	8	0
August	27	1	2	0	0
September	29	0	1	0	0
1946					
June	7	6	4	1	0
July	22	1	3	5	0
August	22	0	6	2	1
September	28	0	2	0	0
1945					
June	0	4	13	5	1
July	0	13	10	5	0
August	23	4	3	0	0
September	25	0	1	3	0
1944					
June	13	1	3	3	2
July	17	3	6	5	0
August	29	0	1	0	0
September	25	0	4	2	0
1943					
June	0	0	0	10	8
July	17	8	6	0	0
August	14	3	9	2	3
September	12	0	8	8	2

compared with other years. One employee at the powerhouse said he had seen very little sludge this year, in fact, less than anytime during the past "ten or twelve years".

Blue-green Algae and Vorticella. Blue green algae were occasionally observed but only in very small and unimportant amounts. Special instructions were given to the men engaged in sampling water on the pond to report the presecense of these algae. There are statements in the literature to the effect that nitrates greatly stimulate algal growth. Vorticella-zoogleal masses were present on the rocks just south of Gulf Island and Deer Rips Dams but in smaller areas than some other years. This summer these white slimy growths were not seen on the walls of the canal system.

Odor Intensities. The system employed for reporting the intensity of the river odor was the same as that used during and since 1943. The numbers and descriptive terms are:

0	no odor	3	distinct
1	very faint	4	decided, and
2	faint	5	very strong.

Throughout this summer, the intensity of the river odor in the Lewiston - Auburn area was lower than that recorded in any year since the daily records were started in 1943. In the downtown areas the odor was not objectionable and on many days, barely noticable to even an experienced observer. All through the high temp-

erature period the river odor in the bridge and gate-house areas could only be described as faint.

Table #5 contains the odor intensity frequencies recorded during the past seven years. Comparison of these numbers enables one to place the years in order of decreasing odor intensity as 1944, 1947, 1943, 1946, 1945, 1948 and 1949.

General Odor Coverage. There was no wide spread odor originating from the water in the downtown areas. Odor from the Pond and Dams penetrated as far as station six on five occasions, the smallest number of times recorded during any of the seven odor seasons. (cf Table #7)

It is of interest to note that general odor coverage occurred twice in June of this year. There was no wide spread coverage in any of the previous years during June. The almost unprecidented high June air and water temperatures coming while the winter production level of pollution was still in the pond, were, of course, the reasons for the very early appearence of odor in the pond area.

Table #5

Odor Intensity Frequencies
1949, 1948, 1947, 1946, 1945, 1944, and 1943
Days per Month.

Intensity #	#1.							#2.						
	49	48	47	46	45	44	43	49	48	47	46	45	44	43
Stn.#1														
June	0	0	0	0	0	0	1	0	0	0	0	0	0	0
July	0	0	0	2	0	3	6	0	0	0	0	0	2	2
Aug.	0	0	1	0	1	2	2	0	0	0	0	0	1	0
Sept.	0	0	2	2	1	1	0	0	0	0	1	0	0	0
Stn.#2														
June	10	10	17	8	14	8	4	4	2	2	9	8	11	12
July	28	11	17	1	13	12	1	3	20	9	22	14	10	22
Aug.	23	18	1	7	1	0	0	8	13	13	17	20	11	23
Sept.	16	23	2	12	12	5	6	0	7	27	17	14	18	24
Stn.#3														
June	6	9	12	5	6	2	0	8	3	6	8	17	14	9
July	15	3	12	1	9	5	1	16	23	13	6	18	10	21
Aug.	14	9	0	7	2	0	2	17	22	9	9	20	8	23
Sept.	15	16	3	12	9	3	0	7	14	13	11	14	18	24
Stn.#4														
June	10	10	17	8	13	4	5	4	2	12	10	13	13	9
July	24	10	16	2	14	11	1	7	19	9	19	12	9	4
Aug.	24	15	1	4	1	0	0	7	16	10	14	17	1	20
Sept.	16	15	1	10	12	5	1	12	11	9	13	14	12	23
Stn.#5														
June	0	0	0	1	1	0	0	0	0	0	0	0	0	0
July	0	0	0	2	22	4	1	0	2	1	4	0	3	2
Aug.	0	6	2	1	0	1	0	0	0	5	3	0	10	1
Sept.	0	0	0	1	0	1	1	0	0	4	2	1	3	1
Stn.#6														
June	0	0	0	0	0	0	0	1	0	0	0	0	0	0
July	0	0	0	1	0	0	0	0	0	0	1	0	4	2
Aug.	0	2	0	0	0	0	0	2	1	2	3	1	5	3
Sept.	0	0	0	1	0	0	0	0	0	1	1	1	4	0
Stn.#7														
June	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July	0	0	0	2	0	0	1	0	0	0	0	0	1	1
Aug.	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Sept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stn.#8														
June	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July	0	0	0	2	0	0	1	0	0	0	1	0	1	0
Aug.	0	0	0	0	1	0	0	0	0	1	0	0	0	0
Sept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table #5

Odor Intensity Frequencies
1949, 1948, 1947, 1946, 1945, 1944, and 1943
Days per month.

#3							#4							Intensity #
49	48	47	46	45	44	43	49	48	47	46	45	44	43	I
														Stn.#1
0	0	0	0	0	0	0	0	0	0	0	0	0	0	June
0	0	0	0	0	0	0	0	0	0	0	0	0	0	July
0	0	0	0	0	0	0	0	0	0	0	0	0	0	Aug.
0	0	0	0	0	0	0	0	0	0	0	0	0	0	Sept.
														Stn.#2
0	0	0	0	0	0	0	0	0	0	0	0	0	0	June
0	0	0	0	0	5	0	0	0	0	0	0	0	0	July
0	0	0	0	2	9	0	0	0	0	0	0	0	0	Aug.
0	0	0	0	0	0	0	0	0	0	0	0	0	0	Sept.
														Stn.#3
0	0	0	2	0	0	1	0	0	0	0	0	0	0	June
0	5	0	2	1	7	3	0	0	0	0	0	1	0	July
0	0	9	1	2	11	3	0	1	0	0	0	0	0	Aug.
0	0	2	0	0	0	0	0	0	0	0	0	0	0	Sept.
														Stn.#4
0	0	0	0	0	5	5	0	0	0	0	0	0	0	June
0	1	0	0	10	19	3	0	0	0	0	0	0	0	July
0	0	6	1	2	4	1	0	0	0	0	0	0	0	Aug.
0	4	2	0	0	0	0	0	0	0	0	0	0	0	Sept.
														Stn.#5
0	0	0	0	0	2	0	0	0	0	0	0	0	0	June
0	0	0	0	0	0	1	0	0	0	0	0	0	0	July
0	0	0	0	0	0	2	0	0	0	0	0	0	0	Aug.
0	0	0	0	0	0	0	0	0	0	0	0	0	0	Sept.
														Stn.#6
0	0	0	0	0	0	0	0	0	0	0	0	0	0	June
0	0	0	0	0	2	3	0	0	0	0	0	0	0	July
0	0	0	0	4	10	0	0	0	0	0	0	2	0	Aug.
0	0	0	0	0	0	0	0	0	0	0	0	0	0	Sept.
														Stn.#7
0	0	0	0	0	0	0	0	0	0	0	0	0	0	June
0	0	0	0	0	0	0	0	0	0	0	0	0	0	July
0	0	0	0	0	0	0	0	0	0	0	0	0	0	Aug.
0	0	0	0	0	0	0	0	0	0	0	0	0	0	Sept.
														Stn.#8
0	0	0	0	0	0	0	0	0	0	0	0	0	0	June
0	0	0	0	0	0	0	0	0	0	0	0	0	0	July
0	0	0	0	0	0	0	0	0	0	0	0	0	0	Aug.
0	0	0	0	0	0	0	0	0	0	0	0	0	0	Sept.

Table #6

General Odor Coverage Data
1949

Date	Highest Intensity	Type	Time Period
June 20	2	Moldy - H_2S.	Evening
22	3	H_2S. - Moldy	Afternoon (Brief)
Aug. 2	3	H_2S.	Early morning
3	2	H_2S.	Early morning
16	2	H_2S.	Six to seven a.m.

Odor Types. Pig-pen. This odor appears to be losing its place as the dominant summer odor; its presence in detectable concentrations in the air in the downtown districts was much less frequent than in any previous year included in these records (of Table #8). Pig-pen was not observed during September, anywhere south of the dams.

Hydrogen sulfide. Hydrogen sulfide appeared very early this year, sufficient was present in the pond to give rise to some widespread odor as early as June 20. However, this odor was not present at the Gulf Island Dam until about June 23.

While the concentration of hydrogen sulfide in the water at the Gulf Island Dam was much less this year than in previous years, there was sufficient present on some early morning periods to be locally objectionable. The area covered was usually quite small.

This early morning situation is due chiefly to the ponding operations at the Dam which prevent the passage of water during the night. This year due, no doubt, to the cessation of third shifts in the mills, the demand for power was such that the generators would be shut down from about eleven p.m. until about six a.m. When the gates were opened the water which passes through during the next two hours or so contains more hydrogen sulfide than that which passes through later in the day. The turbulence forces much of the sulfide into the air.

Hydrogen sulfide was not detected by the observer in the air above the water in the area of the bridges and gate house at any time this summer with perhaps one possible exception. Thus, for the first summer in many years, the downtown district was free from hydrogen sulfide odor emanating from the water passing through. Also, at the Gate House, the white paint on the frames of the windows just above the turbulent water remained white all through the summer, a condition which has not existed for at least a decade.

Other Odors. While it is too soon to be very specific, the odor best described as musty frequently appears to take the place of the pig-pen odor, south of

Deer Ripe Dam. This musty odor is probably derived from the same source as pig-pen and fortunately is much less objectionable to most people.

Table #7

General Odor Coverage for 1949, 1948, 1947, 1946, 1945, 1944 and 1943 (Number of Days and Highest Intensities)

Month	1949 Days	Highest Intensity	1948 Days	Highest Intensity	1947 Days	Highest Intensity
June	2	1 #2	0	-	0	-
July	0	-	4	1 #1 1 #2 1 #3	0	-
Aug.	3	2 #2 1 #3	12	1 #1 8 #2 3 #3	13	7 #3 6 #4
Sept.	0	-	4	2 #2 2 #2	20	1 #2 7 #3 2 #4
Total	5 days 1949		20 days 1948		23 days 1947	

Table #8

Frequency of Recorded Odor Types Days per month 1949 to 1943

Type of Odor	49	48	47	46	45	44	43	49	48	47	46	45	44	43	49	48	47	46
	June							July							Aug			
Pig-pen	2	1	10	17	18	17	0	15	29	26	25	24	26	13	17	24	18	20
Hydrogen sulfide	0	0	0	0	0	2	0	0	8	0	18	0	14	13	17	16	19	17
Moldy	9	5	5	5	11	4	5	4	6	1	4	11	0	0	5	2	3	7
Musty	3	2	3	4	0	11	8	18	0	0	1	3	2	27	17	2	0	5
Earthy	1	0	0	0	6	0	17	0	0	0	1	4	0	10	2	0	3	0
Sulphite	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0
Fishy	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
Sour	0	0	2	3	1	0	0	0	0	0	5	7	1	0	1	0	1	1

Table #7

General Odor Coverage for
1949, 1948, 1947, 1946, 1945, 1944 and 1943
(Number of Days and Highest Intensity)

1946 Days	Highest Intensity	1945 Days	Highest Intensity	1944 Days	Highest Intensity	1943 Days	Highest Intensity
0	-	0	-	0	-	0	-
8	1 #2 7 #3	0	-	5	1 #2 2 #3 2 #4	6	4 #3 2 #4
6	1 #2 2 #3 3 #4	7	3 #3 4 #4	15	1 #2 5 #3 8 #4 1 #5	6	2 #2 3 #3 1 #4
7	1 #2 4 #3 2 #4	4	1 #2 3 #3	8	2 #2 6 #2	0	-
21 days 1946		11 days 1945		28 days 1944		12 days 1943	

Table #8

Frequency of Recorded Odor Types
Days per month 1949 to 1943

45	44	43	49	48	47	46	45	44	43	49	48	47	46	45	44	43	Type of Odor
ust			September							Totals							
21	30	13	0	22	26	21	11	22	11	34	78	75	83	74	95	37	Pig-pen
20	30	16	0	12	24	10	4	15	13	17	56	43	45	24	61	72	Hydrogen Sulfide
12	9	1	1	5	3	2	19	10	0	19	18	12	18	53	23	6	Moldy
0	3	28	21	5	4	4	2	4	24	59	9	12	14	5	20	84	Musty
3	0	0	0	0	0	0	2	0	0	3	0	0	1	15	0	27	Earthy
0	3	5	0	0	0	1	1	0	0	0	0	2	1	1	3	6	Sulfite
1	0	1	0	0	0	1	1	7	0	0	0	0	4	3	7	1	Fishy
5	0	0	0	0	3	0	5	0	1	1	0	6	8	18	1	1	Sour